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perience with *Pinus rigida* and *P. pungens*; and it is doubtless true of other species.

I have noted some interesting variations in *Pinus Banksiana*, which in some way do seem to be connected with location, although I have no doubt that ages of geographical travel from a central point conjoined with the principle of inheritance, might find the natural inherent laws of variation sufficient to account for them. Dr. Gray says, in the last edition of his Manual of Botany, it is a shrub or low tree 5 to 20 feet high, giving N. Maine, N. Michigan and Wisconsin, and northward as the localities. I did not collect in northern Illinois, but friends tell me it grows some thirty miles from Chicago, only as a bush. Michaux observes that in Labrador it shows signs of decrepid old age at 3 feet, and in no part of America did he find it over 10 feet. Dr. Richardson, in Franklin's narrative of a journey to the shores of the Polar Seas in 1819—1822, describes it as 40 feet high in favorable situations, but the diameter of its trunk was greater in proportion to its height than in any other pines of the country. Douglass found it to have longer leaves on the Rocky Mountains than elsewhere. In company with Mr. Wm. Canby, I had the opportunity of examining large forests of them growing on the neck of land between Escanaba, on Lake Michigan, and Marquette, on Lake Superior, where we found them just the reverse of Dr. Richardson's experience. Here they were more slender in proportion to their height, not only than any pine of the country, but probably than any pine elsewhere. Most of the trees were from 30 to 40 feet high, remarkably straight, but only from 6 to 12 inches in diameter. We roughly measured one at Escanaba which was about twenty inches in diameter, and perhaps sixty feet high, little shorter than in fact a very fine *Pinus resinosa*, about two and a half feet through, growing near it.

Now these variations have relation to only one particular, that of size; there would no doubt be found others in many respects; but even in this one character no theory of climate or soil will account for them. If a low temperature dwarfs the Labrador specimens, what is to account for the small bushes in Illinois or southern Wisconsin, in lat. 42°? And again, why are these latter in the rich soils of this district so small in comparison with the almost timber trees of a few hundred miles farther north, and in which is usually considered the poorest land of the north-west? Soil and climate may have some influence in aiding variation, but facts show the origin is deeper than these, namely, a native power to change, kept in check only by inheritance and perhaps external circumstances.

I have heretofore reported *Pinus pungens* as growing at Port Clinton; I find it now abundantly on the hills about Harrisburg; so it may be set down as native to the whole interior of the State of Pennsylvania.

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Nov. 3d, 1868.

The President, DR. HAYS, in the Chair.

Forty-two members present.

The following paper was presented for publication:

Sixth Contribution to the Herpetology of Tropical America. By Edw. D. Cope.

Dr. Leidy called attention to two singular specimens presented this evening by Mr. Lamborn. They were obtained from the Huronian slates near the Dalles of St. Louis River, northern Minnesota. They bear a strong likeness to large coprolites partially imbedded in portions of slate. They not only have the usual form of coprolites, though flattened, but have an apparent spiral arrangement. Taken from the surface slate, the bodies, where exposed to the air have been more readily decomposed than the slate. A broken surface ex-

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hibits a more distinct crypto-crystalline appearance than exists in the slate. Suspecting that they possibly might be of the nature of coprolites, Dr. L. had desired Dr. Genth to analyze part of one. The result was carb. lime 36.5, silica and silicates 59.1, oxide of iron, alumina, etc., 4.4. Though not of vertebrate origin, they may perhaps have been the excrement of some huge invertebrate, which, with all others of the time, are now totally obliterated.

Dr. Leidy further remarked that it was well known that iridescent hues from the surfaces of bodies, independent of thin films, were usually due to amminute striation or parallelism in the arrangement of the elements of structure. Thus is produced the iridescence upon the wings of the house fly and many other insects, that of muscular and tendinous fibres, of pearl shells, artificially ruled surfaces, etc. He has repeatedly observed that the iridescence on the surface of waters was due to the same cause, through myriads of vibrios and bacteria. Under the circumstances he was surprised that authors continue to repeat that the phenomenon of the beautiful play of colors in the precious opal has not been satisfactorily explained. It is evidently due to a regular striated condition of the structure, readily observed by the microscope. The striæ upon brilliant facets examined in a number of opals appear to be about 6000 to the inch. The striæ are probably the pores to which Brewster alludes as being the cause of the coloration of the opal. The brilliancy of labradorite is also due to a regular parallelism in the arrangement of elements of structure.

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*Nov. 10th.*

The President, DR. HAYS, in the Chair.

Forty-two members present.

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*Nov. 17th.*

The President, DR. HAYS, in the Chair.

Twenty-five members present.

Mr. R. P. Stevens made the following remarks on the geology and mineralogy of Venezuela :

Observations made by my party extend two hundred and fifty miles up the Orinoco river from the city of Bolivar, or five hundred from its mouth, and in three directions southwards one hundred and fifty to two hundred miles. In the hydrographical basin of the Orinoco we have seen no other rock than gneiss, gneissoid schists, granite, and other crystalline rocks. The gneiss is granular and lamellar. Its minerals are magnetic iron ore, cupriferous ores, argentiferous galena, and, very sparingly, gold.

We have been able to make out two distinct systems of elevation in this basin ; one running N. and S., the other W. N. W. and E. S. E. The former is a low ridge of black, shining, lamellar gneiss, forming a low divide between the Caroni river and the affluents of the Yuruary, or the line of demarcation between the hydrographical basins of the Orinoco and the Essequibo on the west.

Upon the flanks of these rocks abut the gneiss of the Imitaca Mountains, which forms the divide between these two basins on the north.

The remaining system of elevation runs N. E. and S. W., and corresponds with that of the Appalachian system of the United States.

This system is confined, so far as our observations have seen, to the basin of the Essequibo. The rocks elevated by this system are talcose, with quartz veins, quartzite, porphyry, brecciated schists, and aluminous rock of a bluish color, locally known as "bluestone."

1868.]